基于能量异构的 WSN 分布式路由算法

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摘　要：分析无线传感器网络中的非均匀分簇算法，针对多跳通信方式中存在汇聚节点附近簇首转发任务频繁、能量消耗过快以及频繁进行簇首轮换时能量消耗多的问题，提出一种基于能量异构的 WSN 分布式路由算法(DRA-EH 算法).该算法的节点能量采用 3 级能量架构，根据节点初始能量的不同划分等级；利用圆环模型进行区域划分，定点部署特殊节点；按照簇首分级策略，将簇首分为一级和二级簇首两种类型，采用固定选举簇首与随机选举簇首相结合的方式，来弱化簇头选举中的随机成分，以及节省频繁进行簇首竞选和轮换时的能量消耗；在簇首间构造多跳路由树，采用簇内单跳、树内簇首多跳的路由策略将信息最终传送到汇聚节点.仿真实验表明，DRA-EH 算法在平衡网络能耗和延长网络生命周期方面优于 SEP 算法和 CRVB 算法.

关键词：无线传感器网络；能量异构；簇首分级；区域划分；多跳路由

A Distributed Routing Algorithm Based on

Energy Heterogeneity for WSN

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Abstract：In this paper, a distributed WSN routing algorithm based on energy heterogeneity is proposed to solve the problem of frequent multi-hop forwarding, excessive energy consumption and frequent energy consumption in the cluster head rotation. The node energy of the algorithm adopts the three-level energy architecture, which is classified according to the initial energy of nodes. Using the ring model for regional division and primary nodes and secondary nodes are fixed. According to cluster head classification strategy, the cluster head is divided into the first and second cluster first two types. The combination of fixed cluster head election and random cluster head election is used to weaken the random component. The cluster head rotation order is fixed to save the energy consumption when the nodes frequently perform cluster head election. The multi-hop routing tree is constructed between the cluster heads, using single-hop in the cluster and using multi-hop between clusters. The simulation results show that WSN distributed routing algorithm based on energy heterogeneity is superior to SEP algorithm and CRVB algorithm in balancing network energy consumption and extending network life cycle.

Key words：wireless sensor networks；heterogeneous energy；cluster head classification；region-divided； multiple hops

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